is the most frequent form of cerebral infarction in children. About 40% of the children do not have specific symptoms in the neonatal period with a delayed diagnosis of impairments including hemiparesis, language delay, behavioral problems, cognitive deficiency, and epilepsy. Outcome studies demonstrate that neonatal stroke has a low mortality rate and does not recur. Plasticity of the immature brain probably allows limiting motor and language impairment. In our cohort of patients with neonatal arterial ischemic stroke (AVCnn), 25% of children present with hemiplegia at 2 years of age. Early determinants of motor outcome were available on neonatal imaging. Quality of live was not different at 3,5 years vs. the general population of children of the same age. If early diagnosis can lead to early rehabilitation intervention, little is known about these interventions' efficacy and if they may lead to better outcomes for these children. Over the next 5-years, one of the objectives of the French Centre for Pediatric Stroke is to propose guidelines for diagnosis, management and rehabilitation of patients with perinatal arterial ischemic stroke based on expert consensus and literature review.

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## Energy expenditure of stroke patients in the sub-acute phase according to their walk ability

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*Keywords:* Stroke; Energy expenditure; Walk ability; Sensor
*Objective*.– To determine the level of energy expenditure of stroke patients according to their walk ability.
*Method*.– Energy expenditure (EE) of 88 patients was estimated by a sensor SenseWear (BodyMedia) carried two consecutive days between 9am and 4:30pm, period of rehabilitation. Patients were divided into three groups according to their self-assessed by Functionnal Ambulation Classification (FAC/5). G1 (FAC 0, 34 patients who were unable to walk), G2 (FAC 1 or 2, 30 patients walking with physical assistance) and G3 (FAC $\geq$ 3/5, 24 patients walking without physical assistance).
*Results*.– There were significant differences for global EE (Kcal) between G1(653.4 $\pm$ 179.2)/G3(732.7 $\pm$ 162.7) and G2(625.6 $\pm$ 141.7)/G3(732.7 $\pm$ 162.7), the moderate EE (Kcal) between G1(70.1 $\pm$ 108.5)/G3(129.9 $\pm$ 152.0) and G2(81.8 $\pm$ 98.1)/G3(129.9 $\pm$ 152.0) and the time of moderate activity (minutes) between G1(17.1 $\pm$ 28.6)/G3(31.7 $\pm$ 37.1). However, no differences were found between G1 and G2.
*Discussion*.– An increase of EE as a function of the walk ability was expected. But this hypothesis is rejected due to similar EE levels between G1 and G2. These patients should be asked in a double objective: to improve the quality of their walk and increase their EE.

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## Functional, cognitive and school outcomes after childhood stroke

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*Introduction*.– Childhood stroke and studies on long-term outcome following stroke are rare. The aims of the study were to study clinical presentation and long-term outcomes following childhood stroke.
*Methods*.– We retrospectively reviewed the files of children consecutively admitted to a physical medicine and rehabilitation department following childhood stroke between 1992 and 2010. Age at onset, etiology, motor, sensory and cognitive impairments upon admission and discharge, first and last neuropsychological assessments and academic outcome were collected.
*Results*.– Over the study period, 128 children were hospitalized following ischemic ($n = 45$) or hemorrhagic ($n = 83$) stroke. Upon admission, at day 39, 53% had hemiplegia and 39% were not able to walk. Upon discharge 76% were walking independently and 54% could not use their hand.
Neuropsychological assessment performed on average 6 and 41 months post stroke indicated severe impairments, with FSIQ around 1SD below the expected values. Patients with right hemisphere stroke had impaired PIQ and normal VIQ, whereas patients with left hemisphere stroke had significant impairments in both VIQ and PIQ. After a mean follow up of 52 months, only 37% were following normal curriculum.
*Discussion*.– Childhood stroke leads to severe and long lasting functional and cognitive impairments, with negative consequences on schooling.

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## An analysis of tests for hand functions in patients with stroke

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*Objective*.– Stroke is the source of severe and lasting functional difficulties at the upper limb, a major obstacle to daily life. Our aim is to present actual tests for assessing the upper limb functions, especially at the hand.
*Methods*.– We have searched on the main Internet sites, with keywords such as upper limb, hand, function scale and stroke. Scales were classified according to the ICF. We have selected those that have been validated in stroke patients.
*Results*.– A dozen of scales have been identified, evaluating motor control (medical research council; Fugl Meyer), manipulation of non-significant objects (nine hole peg test, box and block test, action research arm test), manipulation of significant objects (Frenchay arm test, arm motor ability test, Rivermead motor assessment, Wolf motor function test), and participation in daily living activities (motor activity log, abilhand, upper limb assessment in daily living). But their psychometric properties and practical interest (therapeutic) were highly variable.
*Conclusion*.– Many scales have been created to assess the upper limb and the hand. Priority should be given to those which investigate patient difficulties in daily living situations, and help to define objectives and treatment modalities.

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## Randomized controlled trial comparing implanted peroneal nerve stimulation and ankle foot orthosis in spastic paresis

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*Keywords:* Spastic paresis; Gait; Implanted functional electrical stimulation; Ankle foot orthosis
*Introduction*.– Selective functional electrical stimulation (FES) of the peroneal nerve aims to improve ankle dorsiflexion during the swing phase of gait in spastic paresis. We compared gait analysis with implanted FES versus ankle foot orthosis (AFO) in chronic paresis.

*Methods*.– Twenty-four subjects (age 46 ± 15) with chronic paresis were randomized into two groups ($n = 12$/group): implanted FES vs AFO. Kinematics gait analysis at free speed assessed speed, step length, cadence, maximal active dorsiflexion and eversion in swing, dorsiflexion at late swing, without and with assistive device (OFF vs ON) at 3 and 6 months of treatment onset (M3, M6).
*Results*.– Between-groups comparison showed similar treatment effects. The treatment-associated (both groups pooled) kinematic changes included increases in gait velocity (+13%; OFF, 0.69 ± 0.06 m/sec; ON, 0.78 ± 0.06 m/sec, $P = 1.2E-4$), paretic step length (+4%, $P = 0.009$), non-paretic step length (+9%, $P = 0.019$), cadence (+6%, $P = 4.5E-4$), maximal active dorsiflexion (OFF, -4.5 ± 1.4°; ON, 1.1 ± 1.5°, $P = 2.3E-6$), and reduced late swing plantar flexion (OFF, -11.5 ± 1.3°; ON, -2.8 ± 1.5°, $P = 1.5E-7$) and ankle inversion (-30%, $P = 1.3E-4$).
*Conclusion*.– Three and 6 months of implanted peroneal nerve FES or AFO produced similar positive effects based on gait laboratory analysis.

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## Assessment of spasticity with sonoelastography in stroke patients

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*Keywords:* Sonoelastography; Spasticity; Stroke
*Introduction*.– Sonoelastography (SE) which is a ultrasound-based technique can assess tissue elasticity. We have investigated the capability of SE to show muscle stiffness in spasticity and the correlation of SE findings with muscle architecture features in spastic gastrocnemius muscles of stroke patients.
*Material and methods*.– Twenty-six stroke patients (20 males, 63.6%; 6 females, 36.4%) who had spasticity of more than modified Ashworth scale 1+ in gastrocnemius muscle were evaluated with ultrasonography. Muscles architecture features (pennate angle, fascicle length, muscle thickness and muscle compressibility) of gastrocnemius medialis and lateralis on both sides were scanned using B-mode. Elasticity Index (E) was measured using SE in subcutaneous region and muscle. E value ranged from 0 to 6 (6 indicates the hardest tissue).
*Results*.– E ratio was significantly higher in the affected gastrocnemius medialis and lateralis compared to the unaffected side ($P < 0.05$). Pennate angle, fascicle length, muscle thickness and muscle compressibility were lower in the affected side. However, there was only significant difference in muscle compressibility on both side and pennate and on lateral side ($P < 0.05$). There was not any significant correlation between muscle architecture features and SE findings.
*Discussion*.– SE as a novel diagnostic tool can be used to assess spasticity in stroke.

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# Round table

TR04-001-e

## Early supported discharge (ESD) services for stroke patients

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Stroke services in developed countries usually features a period of care in hospital. However, patients and families often face major challenges at the time of discharge home from hospital and in the subsequent weeks of adjusting to care at home. Early supported discharge (ESD) services challenge this model of care by aiming to accelerate discharge home and provide rehabilitation input in the home setting. A substantial number of clinical trials have tested this approach to care but there remain significant challenges in describing the important components of ESD services and ensuring that they are implemented widely.
The objectives of this presentation are to:
– summarize the rationale for ESD services after stroke;
– provide a detailed description of these services as tested in the randomized trials – we are aware of 16 randomized trials of which two tested very atypical ESD services and a further two are not yet reported. These trials suggest that ESD services will:
– reduce the length of hospital stay,
– reduce the number of patients requiring long term nursing home care,
– reduce the number of patients with long term disability,
– summarize the progress in developing guidance for establishing and running such services.

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TR04-002-e

## Early discharge after stroke: A Belgian experience

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*Keyword:* Stroke discharge rehabilitation
In Belgium, the health care financing system puts a pressure to reduce as much as possible the length of stay in all the acute care hospitals. Unfortunately, this system is mainly based on diagnoses (All Patients Refined Diagnostic Related Groups) and does almost not take into account the functional ability of the patients. Consequently, the neurologists try to discharge their stroke patients as soon as possible. The neurologists working in the acute hospital then have to collaborate with other facilities, usually independent from their institutions. If the patient returns home, collaboration with the community-based care is required. If the patient is unable to return home, he will be discharged to rehabilitation facilities or to a nursing home.
Since several years, our Physical Medicine and Rehabilitation department have developed a close collaboration with the Neurology departments for two purposes. On one hand, to provide an early rehabilitation after stroke when the patient stay in the stroke unit and on the other hand, to help the neurologist to discharge the stroke patients by organizing their inpatient or outpatient rehabilitation. To optimize this organization, we are trying to develop a Clinical Pathway.
During this round table, I will share our daily clinical practice experience in this field.

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TR04-003-e

## Stroke rehabilitation and early supported discharge in Ireland

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*Introduction*.– Ireland is currently analyzing the implications of developing the preferred pathway of Early Supported Discharge (ESD) through a national research project.
Materials and methods.– The research team have reviewed the randomized control trials literature and studied cost benefit analysis in ESD.
*Results*.– The literature suggests that there may be a trend towards cost reduction associated with ESD compared with centre-based rehabilitation. Length of stay for stroke patients is shorter and internationally the clinical outcomes appear equivalent to conventional centre based care. Review of the available literature suggests that ESD is feasible and comparable to or superior to conventional care. The research team are currently reviewing the outcomes from a year-long ESD initiative at a large urban general hospital. The objective is to present a case for facilitating the appropriate discharge of suitable stroke patients from acute hospitals to home by supporting them with a well coordinated community rehabilitation team.